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HEMI-SYNC® AND RADIATION ONCOLOGY-A PILOT STUDY

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Background

Hemi-Sync, a binaural-beat brain-wave entrainment technology and consciousness modulating tool developed by Robert Monroe and his associates, can be combined with guided meditation to produce a useful tool for behavioral medicine: the field of treating medical problems with behavioral modalities. The authors applied the technology to the problem of side effects of radiation treatment in cancer patients.

In 2000, Monroe Products released *Chemotherapy Companion*, an exercise in the MIND FOOD® series. It was designed to provide therapeutic images and suggestions combined with binaural beats to patients undergoing chemotherapy. The purpose of *Chemotherapy Companion* was to alleviate nausea and pain. Our group, based at St. Peter's Hospital in Albany, an affiliate of Albany Medical College, wanted to initiate a pilot study to investigate the efficacy of *Chemotherapy Companion*. Medical oncology at St. Peter's Hospital was done by various medical practices within the hospital. Radiation oncology, on the other hand, was organized into a cohesive department. Unfortunately, the major focus of *Chemotherapy Companion* is nausea, which is not a major complaint of radiation patients. Fatigue is a major complaint and to a lesser extent, pain and general discomfort. When the project was conceived there was no specific exercise for radiation therapy, although one was later released. After consultation with The Monroe Institute, we selected MIND FOOD *Energy Walk* for our study. The exercise blends binaural-beat frequencies with nature imagery to encourage rest and rejuvenation.

Brain-wave entrainment technology such as Hemi-Sync is the modern expression of a long tradition of using sound and imagery for healing that antedates the Egyptian and Greek

civilizations. There was even a mystical Jewish-Kabbalistic tradition of healing imagery (Kamenetz 2007). Swiss psychiatrist Carl Jung (2000), French psychologist Robert Desoille (1938), and Italian psychiatrist Roberto Assagioli (2000) incorporated trance and imagery for psychological and general health. In the United States, Carl and Stephanie Simonton (1978) pioneered the use of relaxation exercises and imagery exercises for cancer patients. Slightly later, surgeon Bernie Siegel (1986) established Exceptional Cancer Patients (ECaP), a nonprofit organization to promote group support, as well as trance and imagery work, in the care of patients with cancer and other chronic illnesses. Psychiatrist David Spiegel conducted a double-blind, placebo-controlled study demonstrating that group therapy and group hypnosis exercises were correlated with significantly increased longevity in breast cancer patients (Spiegel et al. 1989). Robert Moss (1996) has written, lectured, and taught extensively in the United States on the related topic of conscious dreaming.

Several Hemi-Sync albums have demonstrated their usefulness for cancer patients. These include the *SURGICAL SUPPORT* series, which has been used by various surgeons and patients. Two anesthesia studies using *SURGICAL SUPPORT* exercises were completed and published in peer-reviewed journals (Kliempt et al. 1999; Lewis et al. 2004). The *POSITIVE IMMUNITY* series was designed with AIDS patients in mind but has also been used by cancer patients. *GOING HOME*[®], a two album series designed for hospice patients and their families, has had a role to play in oncology care, and the first author has discussed several case studies (Holt 2000, 2004, 2006) of that application. Brian Dailey, MD, an attending emergency room physician at Rochester General Hospital, Rochester, New York, has lectured and written on combining Hemi-Sync with energy work and other complementary modalities in oncology treatment and uses such modalities with his patients. Dr. Dailey collaborated on the creation of *Chemotherapy Companion*.

More than two decades of observation and research document the effect of binaural beats on EEG patterns and states of consciousness. James Lane and colleagues completed a study demonstrating that Hemi-Sync beta signals can increase the amount of beta waves measured in EEG spectroscopy and increase performance on a vigilance test (Lane et al. 1998). Research at The Monroe Institute has demonstrated that Hemi-Sync tones promote a frequency-following response conducive to interhemispheric synchrony as measured on EEG brain maps (Atwater 1997). The first author completed several pilot studies (Holt 2004) demonstrating that binaural-beat exercises increase interhemispheric synchrony scores and dramatically increase EEG power in the alpha/theta range. They also enhance hypnotizability (Brady and Stevens 2000). Based on the above findings, the authors of this study concluded that Hemi-Sync could be useful for the relief of symptoms in the radiation oncology population.

Methods

Volunteer patients were recruited from the radiation oncology clinic at St. Peter's Hospital in Albany, New York. An informational flyer was posted in the clinic. Alicia Recore, PhD, made herself available to discuss the study with patients who expressed an interest in the project and provided an informed consent form.

The patients who decided to participate were provided with an audiocassette of MIND FOOD[®] *Energy Walk*. The exercise features Hemi-Sync frequencies primarily in the alpha/theta range and some in the delta range at its conclusion. The narration by Darlene R. Miller, PhD, first guides the listener to relax while counting from one to ten. The listener is then invited to lie on a beach and absorb the healing energy of the earth. From there he or she is directed into the water to absorb that energy and then up to a meadow to absorb the energy of grass, trees, and wind. The exercise concludes by guiding the listener into restful sleep. The patients were encouraged to use the tape on a daily basis. They were provided with the Brief Fatigue Inventory (Mendoza et al. 1999), a questionnaire to assess the impact of fatigue on general activity. Patients filled out the Brief Fatigue Inventory (BFI) daily in the course of listening to MIND FOOD *Energy Walk*. At the end of the study, participants also completed a patient satisfaction questionnaire, which included questions about pain (if it was relevant). The patients were also interviewed by Dr. Recore and information was obtained regarding tape-listening patterns.

The tables below summarize the results for the sixteen patients who returned the BFI questionnaire between 2002 and 2006 and include data on listening frequency and listening times, as well as the results of the patient satisfaction questionnaire. One patient died before treatment was completed, and one patient dropped out for an unspecified reason. Four reported by phone that the tape was helpful for fatigue and pain but did not fill out the questionnaire. Only two of the sixteen found the tape ineffective for pain and fatigue. One of the two did, however, find it effective for relaxation. All sixteen patients who filled out the questionnaire said they would recommend the tape. More than half of the patients who participated found the tape effective for fatigue.

Hemi-Sync Final Results Numeric Change with Patient related Data

RESULTS: NUMERIC CHANGE in PATIENT RATINGS on BRIEF FATIGUE INVENTORY (January 2002 – June 2006)

BRIEF FATIGUE INVENTORY	PATIENT # (prior to post over 14 days)															
0 = No Fatigue 10 = Fatigue as bad as you can imagine Patient Ratings: (+ or -) indicates increase or decrease in fatigue rating from Day 1 to Day 14 0 = no change	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Level of Current Fatigue	-3	-3	-1	-3	-2	+1	-1	-2	+2	-2	+3	+1	0	-3	-3	+1
Level of Usual Fatigue (past 24 hrs)	-1	-1	-3	-1	0	+3	+1	-1	+2	-1	0	-3	+4	-3	-2	-1
Level of Worst Fatigue (past 24 hrs)	-2	-2	-2	-1	-1	0	0	-2	+2	-4	+2	-3	+1	-1	-3	0
0 = Fatigue Does Not Interfere 10 = Fatigue Completely Interferes																
Level of Interference with General Activity	-3	-3	-3	-4	0	+4	-1	-1	+4	-3	+1	+2	+4	-2	-3	-2
Level of Interference with Mood	-3	-4	-5	-5	-1	+1	-1	0	+2	-2	0	0	+2	-2	-2	-3
Level of Interference with Normal Work	-3	-4	-3	-4	-2	+2	-3	+1	+2	-2	-1	0	+2	-2	-3	0
Level of Interference with Enjoyment of Life	-3	-4	-3	-5	-1	+1	-1	0	+3	-2	+1	0	+3	-2	-2	0

LISTENING FREQUENCY				LISTENING TIMES				
1x Day Total 16	2-3x / wk	1x /wk	Other Total 1	Before Trtmt	After Trtmt Total 1	Before Sleep Total 11	Varied Times Total 6	Other
Patient #: 1 2 3 4 5 6 7 8 9 11 12 13 15			Patient #: 10 14 4-5 times per week		Patient # 7	Patient # 1 3 5 7 8 9 11 12 13 14 16	Patient # 2 3 4 6 7 8 10 13 14 15	

PATIENT SATISFACTION QUESTIONNAIRE

PATIENT #	GENDER And AGE	CANCER DIAGNOSIS	RATINGS	VERY (VB) or SOMEWHAT BENEFICAL (SB)	COMMENTS
1	F Data not avail	Breast	Fatigue Pain	VB VB	At tapes end could not make out words; music too loud
2	F Data not avail	Neck	Fatigue Pain	SB SB	Soothing voice helped; needed more talking to promote more relaxed state of mind
3	M Data not avail	Esophagus Throat	Fatigue Pain	VB SB	Reduced amount of medication needed
4	F 56	Breast	Fatigue Pain	SB VB	55515 focusing technique relieved areas of pain not related to treatment site
5	F 47	Breast	Fatigue Pain	VB SB	Recommend tapes be started earlier in treatment (Note: on recommendation of Radiation Oncologist guidelines for start up were half way through treatment to correspond with when height of symptoms would be experienced)
6	M Data not avail	Larynx	Fatigue Pain	NON EFFECTIVE NON EFFECTIVE	
7	F 38	Head Neck Tongue	Fatigue Pain	VB SB	
8	F 50	Breast Lymph Nodes	Fatigue Pain	VB SB	Noticeable difference in fatigue: on days when not listened to the night before, patient was exhausted all day long; Improved sleep; tapes are good for increasing sleep and reducing fatigue
9	F 62	Pelvic Vaginal	Fatigue Pain	SB SB	Decreased anxious reactions to pain When tape used sleep was in 4 hour blocks vs 1_ hour blocks Decreased anxiety when episodically ill Calm stress from work day Facilitated more productive sleep
10	F 41	Breast	Fatigue Pain	VB VB	
11	F 46	Breast	Fatigue Pain	SB SB	
12	F 63	Breast	Fatigue Pain	SB SB	Helped sleep
13	F Data not avail	Breast	Fatigue Pain	NON EFFECTIVE NON EFFECTIVE	Did not notice decreased fatigue, but tape helped patient to relax
14	F 46	Breast Lymph Nodes	Fatigue Pain	VB VB	Relieved anxiety related to feeling fatigue Patient became more in touch/at peace with energy levels Tape would be good for anyone tired and stressed
15	F 51	Breast	Fatigue Pain	VB SB	
16	F 38	Breast	Fatigue Pain	SB SB	Helped sleep when uncomfortable with pain

Notes: 1. All sixteen patients reported that they would recommend the tapes for other patients.
2. For birth date data not available: the two males were in their sixties; the three females in early to late fifties.

Conclusions

The data strongly support the binaural-beat exercise's effectiveness for relieving fatigue associated with radiation treatments. Though this was an open rather than a placebo-controlled study, the effect size (14 out of 15 or 18 out of 20) is far beyond what one would expect from a placebo effect. Questions that arise are:

1. If the study size were greater, what would the data look like?
2. If we could compare the guided meditation without Hemi-Sync and with Hemi-Sync, what would we see?
3. If EEG spectrographic information could be obtained, what would it tell us about effect size and other parameters?
4. If we could control usage/dosage, what effect would that have?

The pilot study by itself gives strong encouragement for utilization of the Hemi-Sync technology as an adjunct to radiation oncology. Further investigation with a larger patient population is recommended.

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